

Catherine Plaisant**Abbreviated Resume**

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Dr. Plaisant is an internationally respected research leader in human-computer interaction and information visualization, with a record of successful applications in health informatics and visual analytics. She is the Associate Director of Research of the Human-Computer Interaction Lab (HCIL) of the University of Maryland. She co-authored with Ben Shneiderman the 4th, 5th and 6th editions of *Designing the User Interface*, a major textbook on the topic of Human-Computer Interaction. Her accomplishments span the interface development lifecycle, with major work in requirements gathering, interface design, and evaluation.

In 2015 Dr. Plaisant was elected a fellow of the ACM CHI Academy (recognizing principal leaders in the field of Human-Computer Interaction). Her 54 journal articles, 91 conference papers, and 13 book chapters are the main products of her research, as are software tools and video demonstrations. She has delivered keynotes at a dozen conferences, co-advised 18 Computer Science PhD theses, and been the principal investigator of 40+ successful grants and contracts.

H index = 52 - using Google Scholar (as of 12/2016)

<https://scholar.google.com/citations?user=VnwWgwIAAAAJ>**Positions and Employment**1987 - present : **University of Maryland****Institute for Advanced Computer Studies, USA**

Senior Research Scientist

Associate Director of Research of the Human-Computer Interaction Laboratory

1982 - 1987 : **Centre Mondial Informatique et Ressources Humaines,****Paris, France**

Research Associate in the "Apprentissage/Learning" research group

Summary of important contributions

(+ selection of highly-cited or award winning or recent papers)

A- Information Visualization Contributions

A-1: Visualization of temporal event sequence data

One of Dr. Plaisant's early projects was LifeLines, a method for presenting a one-screen overview of personal records using interactive timelines. With more than 1,000 combined citations, this work has inspired a generation of designers dealing with historical data and led to applications in medicine, transportation, customer relations, etc. In the case of a medical record; problems, diagnoses, test results or medications are represented as dots or horizontal lines, grouped in facets that can be summarized. Color and thickness illustrate relationships or significance. The display acts as a giant menu giving direct access to details. Zooming allows aggregation. The evaluation of LifeLines was also a landmark in demonstrating and understanding the value of information visualization strategies.

- Plaisant, C., Milash, B., Rose, A., Widoff, S., Shneiderman, B., LifeLines: Visualizing personal histories, in *Proc. of ACM Conference on Human Factors in Computing Systems, CHI'96*, April 1996, ACM, New York, 221-227 (1996) (> 650 citations)
- Plaisant, C., Mushlin, R., Snyder, A., Li, J., Heller, D., Shneiderman, B., LifeLines: Using visualization to enhance navigation and analysis of patient records, *American Medical Informatics Association 1998 Annual Fall Symposium*, 76-80 (1998) (> 332 citations)

Subsequently, Dr. Plaisant co-lead the design and evaluation of a series of visual analytics tools for the study of temporal patterns in collections of records (e.g. medical records, student records, incident records). This work pioneered the new field of event analytics. Specific contributions include: A method for summarizing all sequences of events in a set of records; a graphical user interface for specifying complex search patterns (including temporal constraints and the absence of events); and a set of strategies and tools for data transformations that reveal patterns in complex datasets.

Those ideas have been incorporated in widely available tools and inspired further refinements and alternative designs in academia and industry (e.g. IBM, Twitter, Adobe).

- Wongsuphasawat, K., Guerra Gómez, J., Plaisant, C., Wang, T., Taieb-Maimon, M., Shneiderman, B., LifeFlow: Visualizing an Overview of Event Sequences, *Proceedings of ACM Conference on Human Factors in Computing Systems* (2011) 1747-1756 (>170 citations)
- Wang, T., D., Plaisant, C., Quinn, A., Stanchak, R., Shneiderman, B., and Murphy, S., Aligning Temporal Data by Sentinel Events: Discovering Patterns in Electronic Health Records. *Proc. of ACM Conference on Human Factors in Computing Systems* (2008) 457-466. (> 180 citations)

- Du, F., Shneiderman, B., Plaisant, C., Malik, S., Perer, A., Coping with Volume and Variety in Temporal Event Sequences: Strategies for Sharpening Analytic Focus, *IEEE Transactions on Visualization and Computer Graphics* (2016)

A-2: User Interfaces for Browsing Hierarchical Information

Dr. Plaisant made early research contributions to the design and evaluation of interfaces for the representation and browsing of hierarchical information (such as taxonomies or directories).

For example, Spacetree used interactive zooming and dynamic rescaling of branches of the tree to best fit the available screen space, optimized camera movement, and used preview icons to summarize the topology of the branches that cannot be expanded. The concept was applied by others in research tools (e.g. ontology browsers) and the software was successfully licensed to industry.

- Plaisant, C., Grosjean, J., Bederson, B., SpaceTree: Supporting Exploration in Large Node Link Tree, Design Evolution and Empirical Evaluation, *Proc. of IEEE conference on Information Visualization*, Boston, 57-64 (2002) (>380 citations)
- Lee, B., Parr, C., Plaisant, C., Bederson, B. B., Veklsler, V., Gray, W., Kotfila, C., TreePlus: Interactive Exploration of Networks with Enhanced Tree Layouts, *ACM Transactions on Visualization and Computer Graphics*, 12, 6 (2006) 1414-1427 (>110 citations)
- Guerra Gómez, J., Buck-Coleman, A., Pack, M., Plaisant, C., Shneiderman, B., TreeVersity: Interactive Visualizations for Comparing Hierarchical Data Sets, Transportation Research Record (TRR), *Journal of the Transportation Research Board* (2013) – 21 pages
**** Received the Greg Herrington Award from the National Academy of Sciences Transportation Research Board (TRB) for Excellence in Visualization Research**

A-3 Integrating visualization and data mining

While the use of data mining algorithms is growing rapidly, there is evidence that users of critical applications have concerns about the explicability of those algorithms and want either more control over the process or justifications for the results. Dr. Plaisant's contributions include early examples of successful combination of text mining and visualization and the introduction of prescriptive event analytic tools that help users plan actions based on the historical data of similar records which achieved the desired outcome.

- Don, A., Zheleva, E., Gregory, M., Tarkan, S., Auvil, L., Clement, T., Shneiderman, B., Plaisant, C., Discovering interesting usage patterns in text collections: integrating text mining with visualization, in *Proc. of ACM Conference on Information Knowledge Management* (2007) 213-222 (> 140 citations)

- Plaisant, C., Rose, J., Yu, B., Auvil, L., Kirschenbaum, M.G., Smith, M. N. , Clement, T., Lord, G., Exploring Erotics in Emily Dickinson's Correspondence with Text Mining and Visual Interfaces, *Proc. of the 6th ACM/IEEE Joint Conference on Digital Libraries, JCDL 06*, 141-150 **** Nominated for Best Paper award**
- Du, F., Plaisant, C., Spring, N., Shneiderman, B., EventAction: Visual Analytics for Temporal Event Sequence Recommendation, *Proc. of the IEEE Visual Analytics Science and Technology* (2016)
- Du, F., Plaisant, C., Spring, N., Shneiderman, B., Finding Similar People to Guide Life Choices: Challenge, Design, and Evaluation (under review)

A-4 Understanding network analysis

Good design starts with a thorough needs analysis. Several of Dr. Plaisant's papers have guided others toward the development of useful network analysis tools. Specific contributions proposed alternatives to the node link diagram as graph representation.

- Lee, B., Plaisant, C., Parr, C., Fekete, J.-D., Henri, N., Task Taxonomy for Graph Visualization, *Proc. of BELIV'06, BEyond time and errors: novel evaluation methods for Information Visualization, a workshop of the AVI 2006 International Working Conference*, ACM (2006) 82-86 (> 210 citations)
- Ahn, J., Plaisant, C. and Shneiderman, B., A task taxonomy for network evolution analysis, *IEEE Transactions on Visualization and Computer Graphics*, 20, 3 (2014) 365-376
- Lee, B., Parr, C., Plaisant, C., Bederson, B. B., Veklsler, V., Gray, W., Kotfila, C., TreePlus: Interactive Exploration of Networks with Enhanced Tree Layouts, *ACM Transactions on Visualization and Computer Graphics*, 12, 6 (2006) 1414-1427 (>110 citations)
- Freire, M., Plaisant, C., Shneiderman, B., Golbeck, J., ManyNets: An Interface for Multiple Network Analysis and Visualization, *Proceedings of the 28th int. Conference on Human factors in computing systems (CHI '10)*. ACM, New York, NY, USA, 213-222. (> 60 citations)
- Kang, H., Plaisant, C., Elsayed, T., Oard, D.W., Making sense of archived e-mail: Exploring the Enron collection with NetLens, *Journal of the American Society for Information Science and Technology*, 61, 4 (2010) 723 - 744

B: Leadership role in the evaluation of information visualization and visual analytics

Dr. Plaisant co-chaired the 1st Information Visualization competition in 2003, and the first Visual Analytics Challenge competition in 2006. She also delivered an opening keynote on the Challenges of Information Visualization at the Advanced Visual Interface international conference in 2004. The VAST Challenge remains a successful yearly event of the IEEE VAST conference and has introduced a generation of researchers to the problems of visual analytics. After the conference, the benchmark data sets are made available along with realistic tasks, ground truth information, and the submissions of participants. Dr. Plaisant also spearheaded the Beliv (BEyond time and errors: novel evaluation methods for

Information Visualization) workshop in 2004, now held bi-annually and the lead venue for peer review papers on the topic.

- Plaisant, C., The challenge of information visualization evaluation, *Proc. of ACM Conference on Advanced Visual Interfaces, AVI 2004*, ACM, New York, 109-116 (2004) Keynote talk and paper (> 590 citations)
- Shneiderman, B., Plaisant, C., Strategies for Evaluating Information Visualization Tools: Multidimensional In-depth Long-term Case Studies, Proc. of BELIV'06, BEYond time and errors: novel evaluation methods for Information Visualization, a workshop of the *AVI 2006 International Working Conference*, ACM (2006) 38-43. **Received the IEEE BELIV 2016 Impact Award.** (>360 citations)
- Lam, H., Bertini, E., Isenberg, P., Plaisant, C., Carpendale, S., Empirical Studies in Information Visualization: Seven Scenarios. *IEEE Transactions on Visualization and Computer Graphics*, 18, 9 (2012) 1520-1536 (> 180 citations)
- Plaisant, C., Fekete, J. D., Grinstein, G., Promoting Insight Based Evaluation of Visualizations: From Contest to Benchmark Repository, *IEEE Transactions on Visualization and Computer Graphics*, 14, 1 (2008) 120-134 (>120 citations)

C: Examples of Human-Computer Interaction contributions

C-1 Major textbook

Designing the User Interface is one of the major textbooks on the topic of Human-Computer Interaction. The 6th Edition was just released:

- Shneiderman, B., Plaisant, C., Cohen, M., Jacobs, S., Elmqvist, N., *Designing the User Interface, Strategies for Effective Human-Computer Interaction*, Pearson, 4th Edition (2004), 5th Edition (2009), 6th Edition (2016). (> 13,000 citations)

C-2: Novel User Interfaces for Electronic Health Records Systems

One example of innovation was Lifelines (mentioned in A-1). Another is Twinlist, a user interface for medication reconciliation which received a distinguished paper award at the American Medical Informatics Association conference in 2013. Twinlist illustrates the use of spatial layout and multi-step animation, to help medical providers see what is different and what is similar between lists of medications, then make decisions and rapidly select the drugs they want to include in a reconciled list. Twenty medical providers participated in a controlled experiment comparing Twinlist with a baseline interface. The trials using Twinlist were statistically significantly faster (18%), with fewer clicks (40%) and scrolls (60%), and fewer serious errors. Several vendors are now using Twinlist as inspiration for their new designs. Other contributions includes designs to help patients understand risk, or to reduce the chances of lab results to be missed.

- Rind, A., Wang, T., Aigner, W., Miksch, S., Wongsuphasawat, K., Plaisant, C., Shneiderman, B., Interactive Information Visualization for Exploring and Querying Electronic Health Records: A Systematic Review, *Foundations and Trends in Human-Computer Interaction*, 5, 3 (2013) 1-90

- Plaisant, C., Chao, T., Wu, J., Hettinger, A., Herskovic, J., Johnson, T., Bernstam, E., Markowitz, E., Powsner, S., Shneiderman, B., Twinlist: Novel User Interface Designs for Medication Reconciliation, *Proc. American Medical Informatics Ass. Annual Symposium (2013)* 1150-1159
**** Received Distinguished Paper Award**
- Plaisant, C., Wu, J., Hettinger, AZ, Powsner, S., Shneiderman, B., Novel User Interface Design for Medication Reconciliation: an Evaluation of Twinlist, *J Am Med Inform Assoc.*, 22, 2 (2015) 340-9
- Franklin, L., Rahman, K. M., Plaisant, C., Shneiderman, B., TreatmentExplorer: an Interactive Decision Aid for Medical Risk Communication and Treatment Exploration, *Interacting with Computers* (2014)

C-3 Query Previews

Developed for NASA to search their vast directories of scientific datasets, Query previews are a precursor of faceted search (a now widespread technique on the web)

- Greene, S., Marchionini, G., Plaisant, C., Shneiderman, B., Previews and Overviews in Digital Libraries: Designing Surrogates to Support Visual Information-Seeking, *Journal of the American Society for Information Science*, 51 (3) 380-393 (2000). (> 150 citations)
- Plaisant, C., Shneiderman, B., Doan, K. and Bruns, T., Interface and data architecture for query preview in networked information systems, *ACM Transaction on Information Systems*, 17 (3), 320-341 (1999) (> 140 citations)

C-4 Early work on touchscreen interfaces

Early work on touchscreen was influential to the design of current mobile interfaces

- Plaisant, C., Sears, A., Touchscreen interfaces for flexible alphanumeric data entry, in *Human factors Perspectives on Human-Computer Interaction (Selection from Proceedings of Human Factors and Ergonomics Society Annual Meetings 1983-1994)* Perlman, G., Green, G., Wogalter, M. (Eds), Human Factors and Ergonomics Society, Santa-Monica CA, (1995) 261-265
- Sears, A., Plaisant, C., and Shneiderman, B., A new era for high-precision touchscreen applications, in Hartson H. R. and Hix D. (Eds.) *Advances in Human-Computer Interaction*, Vol. 3., Ablex, Norwood, (1993) 1-33
- Plaisant, C. and Wallace, D., Touchscreen toggle design, 6 minutes video. *SIGGRAPH Video Review*, Issue 77 on CHI'92 Technical video program. ACM, New York (1992).

Associated video: <https://www.youtube.com/watch?v=wFWbdxiciK0>

*** Made popular by the Apple vs. Samsung "slide to unlock" patent war

C-5 Other examples

Finally, here is a sample of highly cited papers exemplifying the breadth of coverage of Dr. Plaisant's contributions in the areas of requirements gathering, interface design, and evaluation.

- Hutchinson, H., Mackay, W., Westerlund, B., Bederson, B., Druin, A., Plaisant, C., Beaudouin-Lafon, M., Conversy, S., Evans, H., Hansen, H., Roussel, N., Eiderbäck, B., Technology probes: inspiring design for and with families, *CHI Letters, Proceedings on Human Factors in Computer Systems*, 726-727 (2003) (> 880 citations)
- Marchionini, G., Plaisant, C., Komlodi, A., The people in digital libraries: Multifaceted approaches to assessing needs and impact, in A. Bishop, B. Bittenfield, & N. VanHouse (Eds.) *Digital Library Use: Social Practice in Design and Evaluation*, Cambridge, MA, MIT Press, (2003) 119-160 (> 120 citations)
- Hornbaek, K., Bederson, B., Plaisant, C., Navigation Patterns and usability of zoomable user interfaces with and without overviews, *ACM Transactions on Computer-Human Interaction*, 9 (4) 362-389 (2003) (> 260 citations)
- Fekete, J.-D., Plaisant, C., Excentric labeling: Dynamic neighborhood labeling for data visualization. *Proc. of ACM Conference on Human Factors in Computing Systems, CHI '99*, ACM, New York, 512-519 (1999) (> 210 citations)
- Zhao, H., Plaisant, C., Shneiderman, B., Lazar, J., Data sonification for users with visual impairment: A case study with geo-referenced data, *ACM Transactions on Computer-Human Interaction*, ACM , 15, 1 (2008) #4 (> 50 citations)
- Plaisant, C., Bederson, B. B., Clamage, A., Hutchinson, H., Druin, A., Shared Family Calendars: Promoting Symmetry and Accessibility, *ACM Transactions on Computer-Human Interaction*, 13, 3 (2006) 313-346 (> 100 citations)